Patent claims

1. A drilling tool having a basic body (14) rotatable about a drill axis (36), having two insert seats (16) arranged in the point region of the basic body (14), and having interchangeable inserts (20) which are interchangeably inserted into the insert seats (16), face one another at a central insert corner (46) over the drill axis (36) while leaving a center gap (60) clear, and have a main cutting edge (28), extending from a radially outer guide bevel (34) up to the central insert corner (46), and a respective rake face (30) and flank (24) which meet in the region of the main cutting edge (28) while forming a cutting wedge, the main cutting edges (28) of the interchangeable inserts (20) complementing one another in the region of a central, angled cutting-edge part (28') to form a chisel edge interrupted by the center gap (60), the interchangeable inserts (20), at their flank (24), having an inclined deflecting chamfer (56) running from an apex line (54), starting from the region of their central cutting-edge part (28'), up to the central insert corner (46), the flanks (24) being inclined positively (γ) in the feed direction in the radially outer region in such a way as to complement one another in an arrow-like manner and negatively (δ) in the feed direction toward the center gap (60) in the region of their deflecting chamfers (56) in such a way as to complement one another in a funnel-like manner, the interchangeable inserts having a locating surface (26) remote from the flank (24) and a through-opening (44), passing through the flank (24) and the locating surface (26), for a fastening element (22), and the deflecting chamfer (56) being inclined in the direction of the

respective locating surface (26), characterized in that the apex line (54) starts from a position within the central cutting-edge part (28') and runs to an opposite insert edge (50), the central cutting-edge part (28') and the opposite insert edge (50) meeting in the central insert corner (46).

2. A drilling tool having a basic body (14) rotatable about a drill axis (36), having two insert seats (16) arranged in the point region of the basic body (14), and having interchangeable inserts (20) which are interchangeably inserted into the insert seats (16), face one another at a central insert corner (46) over the drill axis (36) while leaving a center gap (60) clear, and have a main cutting edge (28), extending from a radially outer guide bevel (34) up to the central insert corner (46), and a respective rake face (30) and flank (24) which meet in the region of the main cutting edge (28) while forming a cutting wedge, the main cutting edges (28) of the interchangeable inserts (20) complementing one another in the region of a central, angled cutting-edge part (28') to form a chisel edge interrupted by the center gap (60), the interchangeable inserts (20), at their flank (24), having an inclined deflecting chamfer (56) running from an apex line (54), starting from the region of their central cutting-edge part (28'), up to the central insert corner (46), the flanks (24) being inclined positively (γ) in the feed direction in the radially outer region in such a way as to complement one another in an arrow-like manner and negatively (δ) in the feed direction toward the center gap (60) in the region of their deflecting chamfers (56) in such a way as to complement one another in a funnel-like manner, characterized in that the interchangeable inserts have a locating surface (26) remote from the rake face (30) and a through-opening (44), passing through the rake face (30) and the locating surface (26), for a

fastening element (22), and in that the apex line (54) starts from a position within the central cutting-edge part (28') and runs to an insert edge (50) on the bearing-surface side.

3. The drilling tool as claimed in claim 1 or 2, characterized in that the rake-face sections (30) belonging to the central and the radially outer cutting-edge part of the main cutting edge (28) enclose a chisel-edge angle (α) of less than 70° in the transition region.

4. The drilling tool as claimed in claim 3, characterized in that the chisel-edge angle (α) is 20° to 40°.

5. The drilling tool as claimed in claim 3 or 4, characterized in that the transition edge between the two rake-face sections (30) is rounded.

6. The drilling tool as claimed in one of claims 1 to 5, characterized in that the radially outer flank part (24) and the central deflecting chamfer (56) enclose an apex angle (β) < 170° with one another in the region of the apex line (54).

7. The drilling tool as claimed in claim 6, characterized in that the apex angle (β) is 120° to 160°.

8. The drilling tool as claimed in one of claims 1, 3 to 7, characterized in that the central deflecting surface (56) has a triangular outline defined by the apex line (54), a section of the central cutting-edge part (28') and a section of the adjacent insert edge (50).

9. The drilling tool as claimed in claim 8, characterized in that the height of the central deflecting surface (56) of triangular outline, this height being measured between the apex line (54) and the insert corner (42), is a multiple of the width of the center gap (60), preferably five to twenty times the width of the center gap (60).

10. The drilling tool as claimed in one of claims 2 to 7, characterized in that the central deflecting surface (56) has a polygonal outline defined by the apex line (54), a section of the central cutting-edge part (28') and a section of the insert edge (50) on the bearing-surface side.

11. The drilling tool as claimed in claim 10, characterized in that the diameter of the central deflecting surface (56) of polygonal outline, this diameter being measured between the apex line (54) and the central insert corner (46), is a multiple of the width of the center gap (60), preferably five to twenty times the width of the center gap (60).

12. The drilling tool as claimed in one of claims 1 to 11, characterized in that the width of the center gap (60) is < 0.3 mm.

13. The drilling tool as claimed in one of claims 1 to 12, characterized in that those sections of the main cutting edges (28, 28') of the two interchangeable inserts (20) which correspond to one another enclose an angle with one another which is not equal to 180°.

14. The drilling tool as claimed in claim 13, characterized in that the angular offset relative to 180° is between 1° and 4°.

15. The drilling tool as claimed in one of claims 1 to 14, characterized in that the two inserts (20) are offset axially from one another.

16. The drilling tool as claimed in claim 15, characterized in that the axial offset is in the order of magnitude of 1/100 mm, preferably 0.005 mm to 0.05 mm.

17. The drilling tool as claimed in one of claims 1 to 16, characterized in that the basic body (14), in the region of the center gap (60) between the insert seats, has a concave contour (72) which is axially set back relative to the insert seats.

18. The drilling tool as claimed in one of claims 1 to 17, characterized in that the insert seat (16) and the interchangeable insert (20) have indentations, engaging one inside the other in a complementary manner, for producing radial interlocking.

19. The drilling tool as claimed in one of claims 1 to 18, characterized in that the interchangeable inserts (20), with their bearing surfaces (48, 64) remote from the rake face (30) and with their locating surface (26), bear against complementary seating surfaces of the insert seat, in that the bearing surfaces (48, 64), via a respective locating bevel (68, 70) forming a channel-like clearance space (80) with the adjacent seating surfaces of the insert seat (16), merge into the locating surface (26), and in that a cooling channel (84, 86) which is arranged in the basic body (16) and to which a cooling lubricant can be admitted opens into each insert seat in the region of the channel-like clearance space (80).

20. A drilling tool having a basic body (14) rotatable about a drill axis (36), having two insert seats (16)

arranged at the end face in the basic body (14), and having interchangeable inserts (20) which are interchangeably inserted into the insert seats (16), face one another at a central insert corner (46) over the drill axis (36) while leaving a center gap (60) clear, and have a main cutting edge (28), extending from a radially outer guide bevel (34) up to the central insert corner (46), a respective rake face (30) and flank (24) which meet in the region of the main cutting edge (28) while forming a cutting wedge, a locating surface (26) remote from the flank (24) and a through-opening (44), passing through the flank (24) and the locating surface (26), for a fastening element (22), the main cutting edges (28) of the interchangeable inserts (20) complementing one another in the region of a central, preferably angled cutting-edge part (28') to form a chisel edge interrupted by the center gap (60), characterized in that the interchangeable inserts (20), with their bearing surfaces (48, 64) remote from the rake face (30) and with their locating surface (26), bear against complementary seating surfaces of the insert seat, in that the bearing surfaces (48, 64), via a respective locating bevel (68, 70) forming a channel-like clearance space (80) with the adjacent seating surfaces of the insert seat (16), merge into the locating surface (26), and in that a cooling channel (84, 86) which is arranged in the basic body (16) and to which a cooling lubricant can be admitted opens into each insert seat in the region of the channel-like clearance space (80).

21. The drilling tool as claimed in claim 19 or 20, characterized in that the channel-like clearance space (80) is open toward the center gap (60).

22. The drilling tool as claimed in one of claims 19 to 21, characterized in that the channel-like clearance

space (80) is open toward the radially outer guide bevel (34).

23. The drilling tool as claimed in one of claims 19 to 22, characterized in that the bearing surfaces (48, 64), remote from the rake face (30), of the interchangeable insert and their locating bevels (68, 70) merge into one another via a rounded insert corner (66, 69).

24. The drilling tool as claimed in claim 23, characterized in that the cooling channel (84, 86) opens into the insert seat (16) in the vicinity of the rounded-off insert corner (66) via an orifice opening (82).

25. The drilling tool as claimed in one of claims 1 to 24, characterized in that the interchangeable inserts (20), in the region of their rake faces (30), have a chip-forming depression (90) adjoining at least part of the main cutting edge (28, 28').

26. The drilling tool as claimed in claim 25, characterized in that the chip-forming depression (90) extends at least partly into the region of the central cutting-edge part (28').

27. The drilling tool as claimed in claim 25 or 26, characterized in that the chip-forming depression (90) extends into the region of the rake face (30) adjoining the deflecting chamfer.

28. The drilling tool as claimed in claim 27, characterized in that the chip-forming depression (90) extends right into the vicinity of the central insert corner.

29. The drilling tool as claimed in one of claims 25 to 28, characterized in that the chip-forming depression (90) extends up to the outer secondary cutting edge (32).

30. The drilling tool as claimed in claim 29, characterized in that the chip-forming depression (90) passes through the outer secondary cutting edge (32).

31. The drilling tool as claimed in one of claims 25 to 30, characterized in that the main cutting edge (28) and the chip-forming depression (90) are separated from one another by a bevel (92) running essentially parallel to the main cutting edge (28).

32. The drilling tool as claimed in one of claims 25 to 31, characterized in that the chip-forming depression (90) has a concave base surface.

33. The drilling tool as claimed in one of claims 25 to 32, characterized in that the chip-forming depression (90) has a partly cylindrical concave base surface.

34. The drilling tool as claimed in one of claims 1 to 33, characterized in that the main cutting edge (28) is interrupted by chip breaker notches (96', 96'') arranged at a distance from one another.

35. The drilling tool as claimed in claim 34, characterized in that the chip breaker notches (96', 96'') are arranged outside the central cutting-edge part (28').

36. The drilling tool as claimed in claim 34, characterized in that chip breaker notches are also arranged in the region of the central cutting-edge part (28').

37. The drilling tool as claimed in one of claims 1 to 36, characterized in that the secondary cutting edge (32) is oriented so as to run parallel to the drill axis or so as to diverge from the drill axis by an angle of up to 3°.

38. An interchangeable insert for double-cutting drilling tools, having a main cutting edge (28) which runs from an outer insert corner (32) up to an inner insert corner (46), having a respective rake face (30) and flank (24) which adjoin the main cutting edge (28) while forming a cutting wedge, having a locating surface (26) arranged on the insert side remote from the flank (24), and having a through-opening (44), passing through the flank (24) and the locating surface (26), for a fastening element (22), the flank (24) having a deflecting chamfer (56) which runs from an apex line (54), arranged in the region between through-opening (44) and inner insert corner (46), up to the inner insert corner (46) and is inclined in the direction of the locating surface (26), characterized in that the apex line (54) starts from a position within a central cutting-edge part (28') and runs to an opposite insert edge (50), the central cutting-edge part (28') and the opposite insert edge (50) meeting in the inner insert corner (46).

39. The interchangeable insert as claimed in claim 38, characterized in that the flank part (24) containing the through-opening (44) and the deflecting chamfer (56) enclose an apex angle (β) of less than 170°, preferably between 120° and 160°, with one another in the region of the apex line (54).

40. The interchangeable insert as claimed in claim 39, characterized in that the deflecting chamfer (56) has a triangular outline defined by the apex line (54), a

section of the central cutting-edge part (28') and a section of the adjacent insert edge (50).

41. The interchangeable insert as claimed in one of claims 38 to 40, characterized in that a relieved portion (58) is arranged in the region of the central insert corner (46) on the side of the locating surface (26).

42. The interchangeable insert as claimed in one of claims 38 to 41, characterized in that the outer flank part (24) containing the through-opening (44) and the deflecting chamfer (56) enclose an apex angle (β) of less than 170° with one another in the region of the apex line (54).

43. The interchangeable insert as claimed in claim 42, characterized in that the apex angle (β) is 120° to 160°.

44. The interchangeable insert as claimed in one of claims 38 to 42, characterized in that the locating surface (26) merges via locating bevels (68, 70) into adjacent bearing surfaces (48, 64) remote from the rake face (30).

45. The interchangeable insert as claimed in claim 44, characterized in that the bearing surfaces (48, 64) remote from the rake face (30) and their locating bevels (68, 70) merge into one another via a rounded insert corner (66, 69).

46. An interchangeable insert for double-cutting drilling tools, having a main cutting edge (28) which runs from an outer insert corner (32) up to an inner insert corner (46), having a respective rake face (30) and flank (24) which adjoin the main cutting edge (28) while forming a cutting wedge, the flank (24) having a

deflecting chamfer (56) which runs from an apex line (54), starting from an angled central cutting-edge part (28') of the main cutting edge (28), up to the inner insert corner (46) and is inclined relative to the outer flank part, characterized in that the apex line (54) starts from a position within the central cutting-edge part (28') and runs to an insert edge (50) on the bearing-surface side.

47. The interchangeable insert as claimed in claim 46, characterized in that the deflecting chamfer (56) and the outer flank part (24) adjoining it in the region of the apex line (54) enclose an apex angle (β) of less than 170° with one another.

48. The interchangeable insert as claimed in claim 47, characterized in that the apex angle (β) is 120° to 160°.

49. The interchangeable insert as claimed in claims 46 to 48, characterized in that the deflecting chamfer (56) has a polygonal outline defined by the apex line (54), a section of the central cutting-edge part (28') and a section of the insert edge (50) on the bearing-surface side.

50. The interchangeable insert as claimed in one of claims 38 to 49, characterized by a chip-forming depression (90) which is arranged in the region of the rake face (30) and adjoins at least part of the main cutting edge (28, 28').

51. The interchangeable insert as claimed in claim 50, characterized in that the chip-forming depression (90) extends at least partly into the region of the central cutting-edge part (28').

52. The interchangeable insert as claimed in claim 50 or 51, characterized in that the chip-forming depression (90) extends into the region of the rake face (30) adjoining the deflecting chamfer.

53. The interchangeable insert as claimed in claim 52, characterized in that the chip-forming depression (90) extends right into the vicinity of the central insert corner.

54. The interchangeable insert as claimed in one of claims 50 to 52, characterized in that the chip-forming depression (90) extends up to the outer secondary cutting edge (32).

55. The interchangeable insert as claimed in claim 54, characterized in that the chip-forming depression (90) passes through the outer secondary cutting edge (32).

56. The interchangeable insert as claimed in one of claims 50 to 55, characterized in that the main cutting edge (28) and the chip-forming depression (90) are separated from one another by a bevel (92) running essentially parallel to the main cutting edge (28).

57. The interchangeable insert as claimed in one of claims 50 to 56, characterized in that the chip-forming depression (90) has a concave base surface.

58. The interchangeable insert as claimed in one of claims 50 to 57, characterized in that the chip-forming depression (90) has a partly cylindrical concave base surface.

59. The interchangeable insert as claimed in one of claims 38 to 58, characterized in that the main cutting edge (28) is interrupted by chip breaker notches (96', 96'') arranged at a distance from one another.

60. The interchangeable insert as claimed in claim 59, characterized in that the chip breaker notches (96', 96'') are arranged outside the central cutting-edge part (28').

61. The interchangeable insert as claimed in claim 59, characterized in that chip breaker notches are also arranged in the region of the central cutting-edge part (28').